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TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE · · FOREST SERVICE

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Top-Dying of Yellow Birch, Upper Michigan 1955-59

The progress of top-dying of yellow birch on the Upper Peninsula Experimental Forest at Dukes, Mich., has been observed since 1954. The proportion of injured trees was greater in 1959 than in any previous year. This is the third in a series of reports designed to keep those interested abreast of a changing situation affecting the most highly valued species in the northern hardwood timber type. Earlier observations are summarized in Technical Notes 444 and 527.

Foresters and loggers throughout the Upper Peninsula reported top-dying in 1959 not only of yellow birch but also of associated hardwoods. At Dukes the injury to other hardwoods was minor compared to that of yellow birch. The stands had 12 percent of all trees injured in 1958. This increased to 17 percent in 1959. In contrast, the survey showed 47 percent of the yellow birch trees with top-dying symptoms in 1958, and 68 percent in 1959. The increase in 1959 came after 2 consecutive years of improvement.

The observations during the last 3 years support the conclusion that top-dying is related to stand density (fig. 1). There was little difference in top-dying between stands until 1956. In that year the proportion of injured trees was greatest in heavily cut stands (less than 50 square feet of basal area per acre), somewhat less in moderately cut stands (50, 70, and 90 square feet of basal area), and least in the uncut area. This relationship has become more pronounced since 1956 with an injury gradient apparent also among the three densities in the moderately cut group.

The cause of top-dying is still undetermined. The injury first appeared in both the uncut and cut stands in 1954, the second growing season after logging. Weather conditions show no associations that account for both the initial top-dying and the increase of 1959. The determining factor could be a prolonged high water table during or just prior to the beginning of the growing season. According to records of the Wisconsin Michigan Power Company during 1949-57, this condition was present only in 1954.

Water table fluctuations have been recorded for the study area since 1957. The water table was within 1.5 feet of the ground surface until May 11 in 1959, but had subsided below this depth by May 3 during the 2 previous years. The prolonged period of high water in 1954 was more pronounced in that the decline did not begin until early June. Observations of water table levels during the spring of the year will be continued.

July 1960

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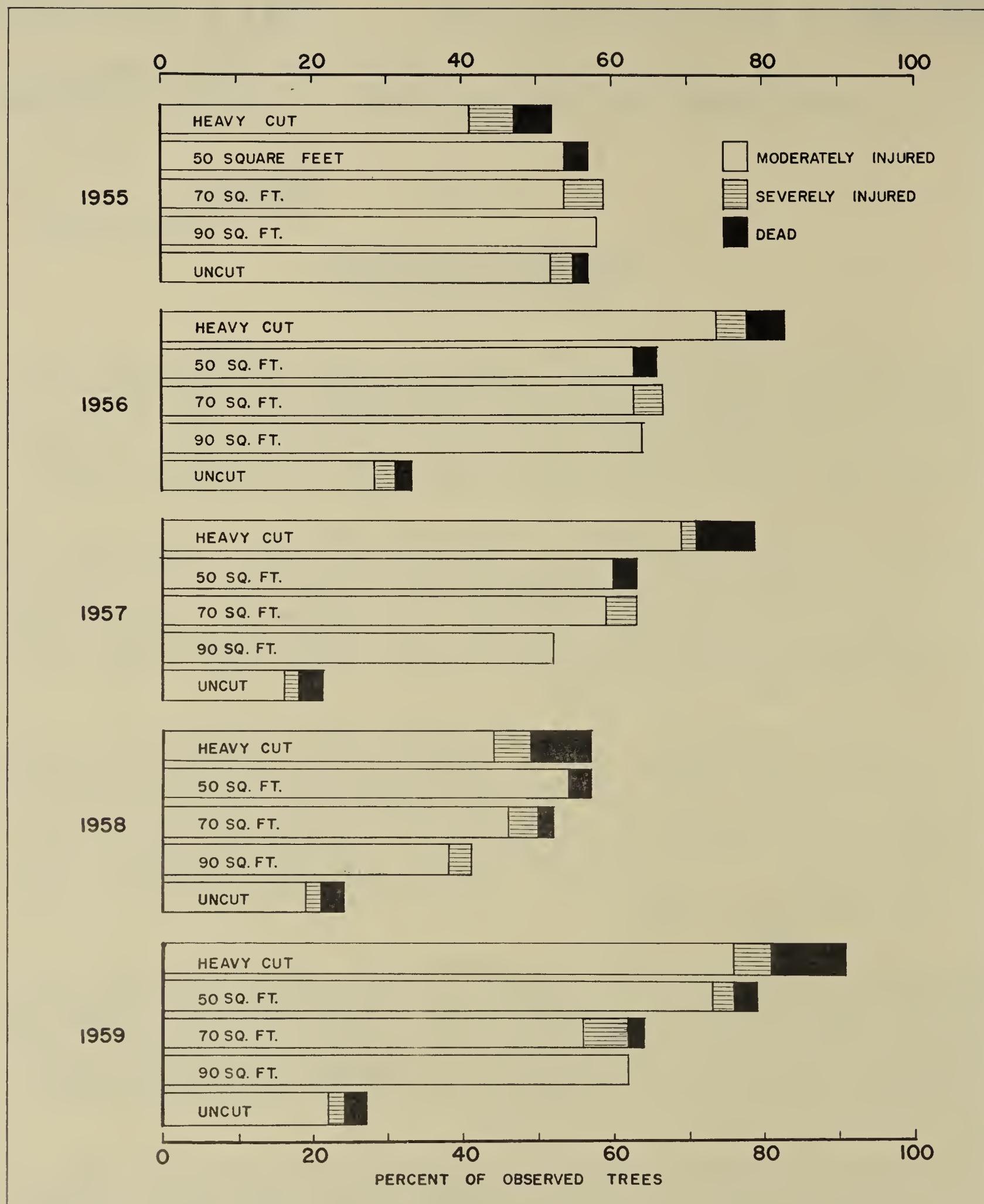


Figure 1.--Annual change in percent of yellow birch trees with top-dying, and severity of injury by intensity of cut. Severely injured trees have over one-half of the crown dead. Moderately injured trees have dead twigs or branches that constitute less than one-half the crown.